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(54) Title: SYSTEM AND METHOD FOR FORECAST AND ORDER PROCESSING

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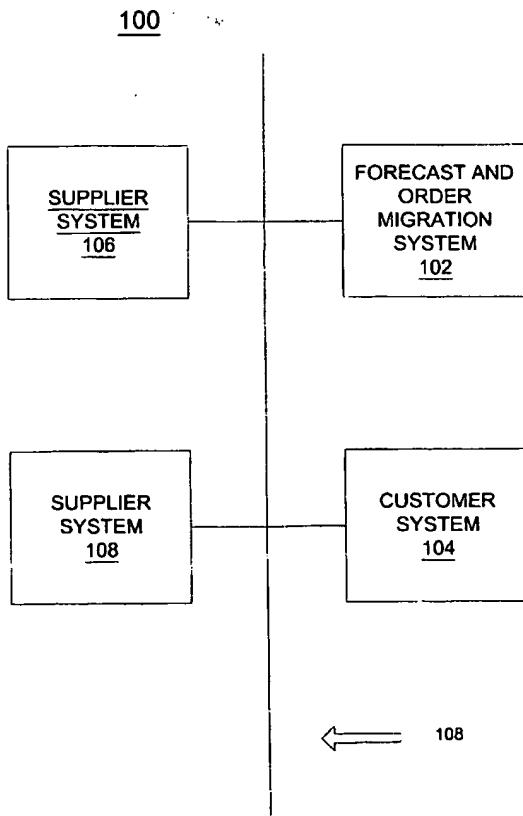
(57) Abstract: This invention relates to a system for forecast and order processing that allows forecast data to be migrated to order data without user input. The system (100) includes customer system (104), which is coupled to communication medium (108). Customer (104) can interface with order migration system (102) so as to allow an operator of customer (104) to provide order migration system (102) with customer forecast, customer inventory data, customer order data, and other suitable data.

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TITLE: SYSTEM AND METHOD FOR FORECAST AND ORDER PROCESSING

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SPECIFICATION

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FIELD OF THE INVENTION

The present invention pertains to the field of data
management systems.   More specifically,   the invention
20 relates to a system and method for forecast and order
processing that allows forecast data to be migrated to order
data without user input.

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BACKGROUND

Data management systems are used to facilitate and control order management and processing. For example, the Electronic Data Interchange (EDI) industry data format standard was developed to allow businesses to interchange electronic data files between data management systems. The EDI data format standard and other formats and systems that have been implemented allow business entities to place orders, receive shipment data, and transmit other business transaction data in an electronic format, such that the business transaction data does not need to be entered by an operator into each business entity's data management system.

Although these data management systems have increased the reliability and efficiency of transactions between business entities, there are still many interactions between business entities for which these data management systems are not useful. For example, a supplier must typically perform many preliminary functions before accepting an order from a customer, such as hiring personnel to produce the product, purchasing raw materials for the product, and purchasing or repairing machinery that is needed to build the product. Likewise, a customer must perform other preliminary functions before placing an order, such as determining the projected demand for the customers' product, determining inventory levels, and determining order quantities based upon minimum and maximum preferred inventory levels and projected demand.

Because of the large number of variables inherent in such interactions, suppliers and customers typically must interface extensively prior to placing and accepting an order. If a customer has a large number of suppliers, or if a supplier has a large number of customers, it is often necessary to employ many personnel to perform such

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interfacing. As such, communication failure between personnel, human error, and other factors can result in the ordering of too many or not enough supplies.

SUMMARY OF THE INVENTION

In accordance with the present invention, a system and method for forecast and order processing are provided that overcome problems of known systems and methods for managing

5   forecast and order data.

In particular, a system and method for forecast and order processing are provided that allow forecast customer needs and forecast supplier availability to be matched, such that order data may be generated without operator

10   interaction.

In accordance with an exemplary embodiment of the present invention, a system for processing transactions between suppliers and customers is provided. The system includes a forecast system that receives forecast need data

15   from at least one customer and forecast supply data from at least one supplier. The system also includes an order migration system that is connected to the forecast system. The order migration system can generate order data for each customer based on certain information, such as inventory

20   data for the customer, the forecast need data of the customer, and the forecast supply data of each supplier.

The present invention provides numerous important technical advantages. One important technical advantage of the present invention is a system for migrating forecast

25   data to order data that allows suppliers and their customers to enter forecast data for availability of supplies and expected ordering levels. In this manner, suppliers and their customers can readily determine whether any supply shortages may exist, and orders can be migrated from the

30   forecast data in the event that the forecast supply data is compatible with the forecast demand data.

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Those skilled in the art will further appreciate the advantages and superior features of the invention together with other important aspects thereof on reading the detailed description that follows in conjunction with the drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a block diagram of a system for forecast and order processing and in accordance with an exemplary embodiment of the present invention;

FIGURE 2 is a block diagram of an order migration system in accordance with an exemplary embodiment of the present invention;

FIGURE 3 is a diagram of a customer system in accordance with an exemplary embodiment of the present invention;

FIGURE 4 is a diagram of a supplier system in accordance with an exemplary embodiment of the present invention;

FIGURE 5 is a diagram of a virtual marketplace in accordance with an exemplary embodiment of the present invention;

FIGURE 6 is a flow chart of a method for processing forecast and order data in accordance an exemplary embodiment of the present invention;

FIGURE 7 is a flow chart of a method for generating order data from forecast data in accordance with an exemplary embodiment of the present invention; and

FIGURE 8 is a flow chart of a method for allocating forecast data in accordance with an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

In the description which follows, like parts are marked throughout the specification and drawings with the same reference numerals, respectively. The drawing figures may 5 not be to scale and certain components can be shown in generalized or schematic form and identified by commercial designations in the interest of clarity and conciseness.

FIGURE 1 is a block diagram of a system 100 for forecast and order processing in accordance with an 10 exemplary embodiment of the present invention. System 100 allows suppliers and customers to migrate forecast data to order data without operator involvement.

System 100 includes order migration system 102. Order migration system 102 can be implemented in hardware, 15 software, or suitable combination of hardware and software, and can be one or more software systems operating on one or more server platforms. As used herein, a software system can be implemented as one or more objects, agents, subroutines, executable software files, lines of code, self- 20 contained software programs, software data files, compiled software files, software code structures contained in different software files, or other suitable software configurations, and can operate on one or more computing platforms. For example, order migration system 102 can be 25 implemented as a software system comprising a large number of separate files that operates in conjunction with a server software operating system and software device drivers.

Order migration system 102 is coupled to communications medium 108. As used herein, the term "couples" and its 30 cognate terms, such as "coupled" and "coupling," can refer to a physical connection (such as a copper conductor), a virtual connection (such as through randomly-assigned memory

locations of a memory device), a logical connection (such as through logical gates of a semiconducting device), through suitable combinations of such connections, or through other suitable connections.   For example, systems or components

5 can be coupled through intervening systems or components, such as through an operating system of a computing platform.

Communications medium 108 allows data communication between the systems and components coupled to communications medium 108.   For example, communications medium 108 can be

10 the public switched telephone network, a local area network, a wide area network, the Internet, a wireless network, or other suitable communications media.

System 100 includes customer system 104, which is coupled to communications medium 108.   Customer system 104

15 can be implemented in hardware, software, or a suitable combination of hardware and software, and can be one or more software systems operating on a general purpose computing platform.   For example, customer system 104 can be implemented in *.HTML code or other suitable code that is

20 downloaded by an Internet browser system operating on a general purpose computing platform.   Customer system 104 can interface with order migration system 102 so as to allow an operator of customer system 104 to provide order migration system 102 with customer forecast data, customer inventory

25 data, customer order data, and other suitable data.

The supplier systems 106 are coupled to communications medium 108 and can be implemented in hardware, software, or a suitable combination of hardware and software.   Each supplier system 106 can be *.HTML code or other suitable

30 code that is downloaded from order migration system 102 by an Internet browser system operating on a general purpose computing platform.   Each supplier system 106 can interface

with order migration system 102 so as to enter forecast data, receive order data, and to provide or receive other suitable data.

In operation, customer system 104 interfaces with order migration system 102 to enter forecast data (such as needed amounts of materials, grades, package sizes, delivery dates, delivery locations, and other suitable forecast data), inventory data (such as current inventory levels, maximum and minimum preferred inventory levels, location of inventory, and other suitable inventory data), and order data (such as orders for any forecast data or other suitable order data). For example, customer system 104 can enter a forecast need of 10,000 pounds of enriched white flour (plus additional data, such as grade, package size, date of delivery, and other suitable data). Supplier system 106A can also enter a forecast availability of 30,000 pounds of enriched white flour. Order migration system 102 can match the forecast need of customer system 104 with the forecast availability of supplier system 106A, and can migrate the forecast into an order at a suitable time. Forecast data can include a lead time component, whereas order data can be placed to meet immediate needs or needs that will arise in the near future. Order migration system 102 allows customer system 104 and supplier system 106 to coordinate forecast data so as to facilitate the migration of the forecast data to order data.

In another exemplary embodiment, customer system 104 enters forecast data for 10,000 pounds of enriched white flour into order migration system 102. Supplier system 106A enters forecast availability data of 5,000 pounds of enriched white flour, and supplier system 106B enters forecast availability data of 7,000 pounds of enriched white

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flour. Order migration system 102 allocates the forecast data of customer system 104 between supplier systems 106A and 106B, according to predetermined criteria. For example, order migration system 102 can equally allocate the order

5   between supplier systems 106A and supplier system 106B. Alternatively, order migration system 102 can allocate the order for customer system 104 to supplier system 106B to maximum extent that supplier system 106B can meet the order, and then allocate the remainder of the order to supplier

10 system 106A. In this manner, order migration system 102 can dynamically migrate forecast data to order data without operator intervention.

· Thus, if forecast data, inventory data or other data has been modified by customer system 104, order migration

15 system updates the data and adjusts forecast allocation and order data accordingly. Likewise, if forecast data is modified by supplier system 106A or 106B, forecast allocation data and order migration data are modified by order migration system 102 without requiring any operator

20 interaction. In this manner, order data can be generated from forecast data and orders can be placed without operator interaction.

Customer system 104 and supplier systems 106A and 106B can also interface with order migration system 102 to modify

25 the order data. For example, order migration system 102 can send an alert or other notification to customer system 104 or supplier system 106A or 106B if conflicts arise between the forecast data of customer system 104 and supplier system 106A and 106B. For example, if customer system 104 enters

30 forecast data for 10,000 pounds of enriched white flour, and supplier systems 106A and 106B enter a combined forecast availability of 8,000 pounds of enriched white flour, order

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migration system 102 can send notification data to customer system 104 that supplier systems 106A and 106B do not have sufficient forecast availability to meet the forecast order data submitted by customer system 104. The operator of customer system 104 can then attempt to identify additional suppliers to meet the forecast data. Likewise, if an operator of customer system 104 lowers forecast data, a notification can be sent to supplier system 106A or 106B to alert them to the decrease forecast needs so that the operators of supplier systems 106A and 106B can adjust production levels accordingly.

If no discrepancies in forecast data exist, order migration system 102 migrates the forecast data to order data at a predetermined time. For example, the operator of customer system 104 can set dates by which orders should be migrated, where a penalty can be assessed for variations in order quantities after the order has been migrated. Likewise, supplier systems 106A and 106B can set increasing price levels, such that an incentive is created for early ordering, and a penalty is assessed for delayed ordering or modifications to order quantities after certain dates. In this manner, customer system 104 and supplier systems 106A and 106B can optimize their production and supply processes without requiring operator interaction. Likewise, customer system 104 can compare forecast data for different supplier systems 106A and 106B and make allocations based upon predetermined criteria, without requiring operator interaction.

FIGURE 2 is a block diagram of an order migration system 102 in accordance with an exemplary embodiment of the present invention. Order migration system 102 of FIGURE 2 includes additional functionality to facilitate entry of

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forecast data and migration of the forecast data to order data.

Order migration system 102 in the exemplary embodiment shown in FIGURE 2 includes forecast system 202, order migration system 204, and order processing system 206. Each of these systems can be implemented in hardware, software, or a suitable combination of hardware and software, and can be one or more software systems operating on one or more general-purpose server platforms.

Forecast system 202 includes auction system 208, and can be implemented in part with the Syncra CT™ for Manufacturers software application manufactured by Syncra Systems, Inc. of Cambridge, Massachusetts. Forecast system 202 receives forecast data from customer systems 104 and supplier systems 106, and interfaces with other components and systems of order migration system 102 to allow the forecast data to be used by those components and systems. For example, forecast system 202 can receive forecast purchase requirements from customer systems 104 and forecast availability data from supplier systems 106, and can allow operators of the customer systems 104 to view forecast availability data of supplier systems 106. Likewise, operators of supplier systems 106 can view the forecast data for customer systems 104. In one exemplary embodiment, an operator of customer system 104 can see forecast data for the supplier systems, but one of the other supplier systems can not see forecast data for the other supplier system. Likewise, an operator of a supplier system 106 can see forecast data for the customer systems 104, but can not have access to the forecast data for the other supplier systems 106. In this manner, customers and suppliers can use order migration system 102 without concern that their competitors

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can have access to their forecast data.

In another exemplary embodiment, customer systems 104 can segregate forecast data for different supplier systems 106, such that customer system 104 can provide different
5   forecast data to different suppliers. Likewise, an operator of a supplier system 106 can provide different forecast data to different customers, such as different price data, different price incentives, or other suitable variations. In this manner, a customer system 104 or supplier system 106
10   can control access to forecast and order data as desired, but can receive a single report identifying all forecast data and all order data, so as to facilitate the ordering of materials, supplies, and control of inventory.

Auction system 208 can allow an operator of customer
15   system 104 or supplier system 106 to bid on supplies or orders, as suitable. For example, the operators of customer systems 104 can place bids on supplies offered for sale by supplier systems 106, such that supplier systems 106 can realize a greater unit sale price for goods that are in
20   demand. Likewise, operators of customer systems 104 can request bids from operators of supplier systems 106 for goods or services, so as to receive a minimum possible price for the goods or services. Auction system 208 can also allow parties that have not been identified as suppliers for
25   customer systems 104, or parties that have not been identified as customers for supplier systems 106, to place or request bids on items. In this manner, new business opportunities can be identified based upon cost, availability, or other objective data.

30   Order migration system 204 includes customer reporting system 212, notification system 216, supplier analysis system 214, and inventory management system 218. Customer

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reporting system 212 can generate customer reports based upon user-selected criteria. For example, customer reporting system 212 can be used to generate reports showing forecast availability of goods, price incentives, and

5   availability of goods from other suppliers. Customer reporting system 212 can be used to generate reports at predetermined intervals. For example, the operator of a customer system 104 can request weekly reports to be delivered on predetermined days, or other suitable reports.

10 Supplier analysis system 214 can receive supplier data that is used by customer system 104 to make selections between suppliers. For example, supplier analysis system 214 can track objective figures of merit such as order completion data, price data, customer feedback data, and

15 other suitable data, and customer systems 104 can make predetermined selections of the importance of the different objective figures of merit for choosing or allocating orders between certain suppliers. Supplier analysis system 214 can also allow customer system 104 to pre-select supplier

20 preferences, to allow suppliers to be automatically selected without regard to the objective figures of merit.

Notification system 216 can be implemented in part with the Enablenet™ and e-Adapter™ guaranteed message delivery service available from Commerce Quest of Tampa, Florida.

25 Notification system 216 can generate scheduled and non-scheduled notification data for customers and suppliers, and can provide guaranteed delivery of messages to ensure that the messages are not misdirected, undelivered, or otherwise not provided to a necessary system or component. For

30 example, notification system 216 can send an alert when inventory levels for a customer are projected to fall below predetermined allowable minimums or to rise above

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predetermined allowable maximums. Likewise, notification system 216 can generate alert data when a customer or supplier changes forecast data in a manner that would allow the forecast data of another party to be adversely affected.

5   Inventory management system 218 can receive inventory data for customers and interface with customer reporting system 212, notification system 216 and supplier analysis system 214 to generate order data. For example, a customer system 104 can enter predetermined minimum and maximum

10 preferred inventory levels for inventory items, such as a 5,000-pound minimum and a 10,000-pound maximum for enriched white flour. The customer system 104 can also provide forecast data of 5,000 pounds of enriched white flour. Subsequent to the entry of the forecast data, customer

15 system 104 can update current inventory levels, such as to 7,000 pounds for enriched white flour. Inventory management system 218 can generate order data of 3,000 pounds of enriched white flour for the customer, based upon the customer's current and maximum preferred inventory levels.

20 In this manner, the customer need only update current inventory levels and order data will be updated accordingly.

Order processing system 206 can be implemented in part by the Commerce Center™ 6.03 software system manufactured by Tradex Technologies of Atlanta, Georgia. Order processing

25 system 206 can receive order data from order migration system 204 and generate order data for transmission to supplier system 106, and then receives order confirmation data from supplier system 106 and transmits the confirmation data to customer system 104. After the order has been

30 shipped by supplier system 106, order processing system 206 can receive the shipping data from supplier system 106, transmit the shipping data to customer system 104, and

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receive receipt data from customer system 104. In this manner, order processing system 206 can track the progress of an order and can alert any or all parties if predetermined parameters have not been met. For example, if
5   the order generated by inventory management system 218 indicates that 2,000 pounds of enriched white flour should be shipped by the first of the month, and the order has not been shipped by the first of the month, notification data can be generated and transmitted to customer system 104 and
10   to supplier system 106 to alert them of the condition.

Order processing system 206 can also receive shipping data from the customer system and can use that shipping data to update inventory levels automatically. For example, if the customer is a bread manufacturer and uses order
15   migration system 102 of FIGURE 2 for processing of all orders, then the amount of ingredients for bread that may be required can be determined from the amount of bread shipped. In this manner, order processing system 206 can be used to determine changes in inventory based upon historical usage
20   rates and can automatically generate order data and modifications to inventory data based upon actual shipments.

In operation, order migration system 102 allows a customer system 104 to enter forecast and inventory data and automatically migrates the forecast data to order data.
25   Supplier system 106 can enter forecast data and can have order data migrated automatically from the forecast data. If any conditions requiring operator attention develop, order migration system 102 generates notification data for the operator of the customer system 104 and the supplier
30   systems 106 that are affected. Likewise, order migration system 102 can generate order data based upon usage data received from order processing system 206. In this manner,

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the entire replenishment inventory supply process can be automated in a manner that allows orders to be placed based upon forecast, and can allow operator intervention to modify forecast data and to address situations that arise that are

5   outside of preset parameters.

Order migration system 102 provides significant advantages over the prior art.   For example, alternate suppliers for raw materials can be identified without requiring extensive human interaction, sharing of trade

10   secret information, the sharing of competitive information, or other loss of control data.   In addition, objective criteria for supplier and customer relationships can be developed and tracked, such that recurring orders from noncompliant suppliers or to unprofitable customers can be

15   avoided that might otherwise be placed because of human error.   Order migration system 102 of FIGURE 2 thus allows customers and suppliers to increase the efficiency and reliability of the order placement process without requiring daily intervention and oversight of that process.

20   **FIGURE 3** is a diagram of a customer system 300 in accordance with an exemplary embodiment of the present invention.   Customer system 300 includes customer system 104 and contains additional functionality.

Customer system 300 includes forecast entry system 302,

25   inventory entry system 304, order migration reporting system 306, notification system 308, supplier reporting system 310 and order entry system 312, each of which can be implemented in hardware, software, or a suitable combination of hardware and software and which can be one or more software systems

30   operating on a general purpose computing platform.   For example, each of these systems can be implemented as *.HTML code or other suitable code that is downloaded and operated

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by a web browser software system of the general purpose computing platform.

Forecast entry system 302 can generate a query for an operator and receive forecast data entered by that operator.
5 For example, forecast entry system 302 can allow the operator to select from a predetermined list of suppliers and to allocate forecast amounts or quantities of goods for those suppliers. Likewise, forecast entry system 302 can allow an operator to select from a predetermined list of
10 suppliers, or other predetermined list, and can allow the operator to select classes of suppliers for which the forecast data is to be presented. Thus, an operator can elect to have a forecast made available to all suppliers operating on the system, predetermined suppliers, or
15 suppliers having predetermined criteria such as shipment volume levels, price levels, quality levels, or other suitable criteria.

Inventory entry system 304 can receive inventory data from a customer system 104. For example, inventory entry
20 system 304 can prompt an operator to enter minimum and maximum inventory levels and current inventory levels, to determine order data in a manner that will minimize the chance that inventory levels will exceed the predetermined minimums and maximums.

25 Order migration reporting system 306 can interface with order migration system 102 so as to generate a report of forecast data and migrated orders. For example, order migration reporting system 306 can show forecast data that is about to become an order, forecast data that has not yet
30 entered the order transition process, and existing order data, such that the supplier can elect to modify forecast data, pending order data, or existing order data where

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suitable.

For example, suppliers can implement price incentives that would result in penalties for cancellation of an existing order. If fulfillment of an existing order would result in excess inventory over maximum allowed inventory, a customer can elect to proceed with a forecast pending order and exceed the allowed inventory levels for a short period of time rather than incur the penalties for canceling the current order. Order migration reporting system 306 presents order data, price data, penalty data, and other suitable data, to operators.

Notification system 308 can receive predetermined data from order migration reporting system 306 and generate notification data for customer systems. For example, if a customer system or supplier system alters forecast data, price incentive data, or other data in a manner that would affect other corresponding customer systems or supplier systems, notification system 308 can generate suitable notification data for the affected customer system. Notification system 308 can operate in conjunction with notification system 216.

In one exemplary embodiment, a supplier system can decrease forecast availability of materials such that a pending order for a customer system must be decreased. Notification system 308 generates notification data for the customer system, such that the customer system can determine how to reallocate the order quantities between other suppliers.

In a similar manner, changes in prices or price incentives can cause notification data to be generated for customer systems. In another exemplary embodiment, a first supplier system can decrease prices, thus creating an

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incentive for customer systems to place orders with the
first supplier system instead of allowing a forecast with a
second supplier system to migrate to an order. Notification
data can be generated for such customer systems that alerts
5   the customer systems to such conditions. Notification
system 308 thus allows notification of events having both
negative and positive consequences.

     Supplier reporting system 310 tracks data that can be
used by the customer to choose between suppliers. For
10   example, supplier reporting system 310 can present an
operator of a customer system with supplier system data
regarding changes in price, changes in forecast amounts,
missed shipment dates, and other information of interest to
an operator of a customer system. Thus, supplier reporting
15   system 310 allows operators of customer systems to identify
suppliers that routinely increase prices after posting
forecasts, that implement strict penalties, that do not meet
shipment dates, or that have other objective performance
indicators that may not be amenable to the customer system's
20   needs. In this manner, operators of customer systems can
select supplier systems having suitable objective
performance indicators.

     Order entry system 312 allows an operator of a customer
system to modify or enter orders for order migration system
25   102 or order processing system 206. For example, order
entry system 312 can be used to modify an order that is in
the process of being migrated from a forecast. Likewise,
order entry system 312 can be used to enter a new order, to
modify existing orders, or to perform other suitable
30   functions.

     In operation, customer system 300 allows a customer to
analyze and modify predetermined data so as to facilitate

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the migration of forecast data to order data. Forecast data can be entered for a customer and the forecast data for suppliers can be analyzed to determine alternate ordering strategies. Predetermined inventory and order minimum and
5   maximum level data can be entered such that orders are automatically generated without requiring operator intervention. Discrepancies in order data can be processed by notification system 308 to alert the customer of conditions requiring operator intervention.

10   **FIGURE 4** is a diagram of a supplier system 400 in accordance with an exemplary embodiment of the present invention. Supplier system 400 and its associated systems can be implemented in hardware, software or a suitable combination of hardware and software, and can be one or more
15   software systems operating on a general purpose computing platform. Supplier system 400 can also include software or hardware functionality that operates on a server platform and which transfers predetermined data to a supplier terminal when the supplier terminal accesses the server.

20   Supplier system 400 includes forecast entry system 402, customer historical data system 404, order processing system 406, and notification system 408. Forecast entry system 402 can receive forecast data from a supplier. For example, forecast entry system 402 can allow the supplier to select
25   from a predetermined list of customers and to allocate forecast amounts or quantities of goods, services, supplies, or other items for those customers. Likewise, forecast entry system 402 can allow a supplier to select from a predetermined list of customers or other predetermined
30   lists, and can allow the supplier to select classes of customers for which the forecast data is to be presented. Thus, a supplier can elect to have a forecast made available

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to all customers operating on the system, predetermined customers, or customers having predetermined objective criteria such as shipment volume levels, price levels, payment history records, or other suitable criteria.

5   Customer historical data system 404 provides suppliers with historical data of customers. For example, data that describes the customer's modification of orders, modification of order migration from forecast data, price penalty modifications, cancellation of forecasts prior to

10   order migration, and other suitable data can be presented in a suitable format. This data allows the operator of the supplier system to determine whether or not to offer forecast data to or to accept order data from a customer.

          Order processing system 406 allows a supplier to review

15   orders, accept orders, modify orders, or perform other suitable functions. For example, order processing system 406 can interface with an auction system to allow the supplier to place bids on materials ordered by a customer. Likewise, order processing system 406 can allow a supplier

20   to modify existing orders or to receive order data, such as orders being placed or orders that have been placed by customers and for which cancellation would require significant penalties.

          Notification system 408 can receive predetermined data

25   from order processing system 406 or from an order migration system and can generate notification data for the supplier. For example, if a customer system alters forecast data, price data, or other data in a manner that would affect the supplier, notification system 408 can generate suitable

30   notification data for the supplier. Notification system 408 can operate in conjunction with notification system 216.

          In operation, supplier system 400 allows a supplier to

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analyze and modify predetermined data so as to facilitate the migration of forecast data to order data. Forecast data can be entered for a supplier and performance data for customers can be analyzed to determine alternate pricing and
5   business strategies. Order timing data, price incentives, and penalties can be entered such that orders are automatically generated without requiring operator intervention. Discrepancies in order data can be processed by notification system 408 to alert the supplier of
10   conditions requiring operator intervention.   -

        FIGURE 5 is a diagram of a virtual marketplace 500 in accordance with an exemplary embodiment of the present invention. Virtual marketplace 500 includes customer systems 104A through 104D, supplier systems 106A through
15   106D, and order migration system 102, which includes map system 502.

        Map system 502 can be implemented in hardware, software, or a suitable combination of hardware and software and can be one or more software systems operating on a
20   general purpose server platform. Map system 502 can map data formats for customer systems 104A through 104D and supplier systems 106A through 106D. For example, customer system 104A can use an EDI data format for placing orders and other transaction data. Likewise, supplier system 106A
25   can use an ASCII data format for transmitting orders and other transaction data. Map system 502 can convert data generated by order migration system 102 into any of the formats used by customer systems 104A through 104D and supplier systems 106A through 106D, and can convert data
30   received from these systems into a data format used by order migration system 192. In this manner, map system 502 allows a supplier that operates inventory management and order

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processing software using one data format to interface with customers that use inventory management and data processing software having a different data format.

Map system 502 therefore allows order migration system 5   102 to interface suppliers and customers that might not otherwise be able to interface in the existing marketplace. For example, in the existing marketplace, customer system 104A would need to interface directly with each of supplier systems 106A through 106D. Likewise, each other customer 10   system 104B through 104D would also need to communicate directly with each of the supplier systems. Depending on customer/supplier relationships and the quantities of materials available to order, the development or adoption of a new electronic data communication standard format for any 15   given supplier or customer might not be economically feasible. Map system 502 of order migration system 102 in FIGURE 5 allows customer systems and supplier systems to interface that might not otherwise be able to economically interface, thus providing for increased market efficiencies 20   and the identification of customer/supplier relationships that might not otherwise have been possible.

For example, it is possible that a supplier that was not previously known to a customer can become that customer's primary supplier, based upon geographic location, 25   quality of goods, or other factors. Map system 502 allows such supplier/customer relationships to develop at smaller levels that would otherwise be not economical if they would require conversion of order processing and inventory management data systems.

30   **FIGURE 6** is a flow chart of a method 600 for processing forecast and order data in accordance an exemplary embodiment of the present invention. Method 600 can be used

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to allow customers and suppliers to coordinate forecasts and order information.

Method 600 begins at 602 where customer forecast data is received. In one exemplary embodiment, the customer forecast data is for inventory items for a food manufacturing business, such as dry food components, refrigerated food components, canned food components, frozen food components, food packaging components, food preparation components, and other food components. The customer forecast data can be in the form of bulk quantities of raw goods, or can alternatively be in bulk quantities of finished goods where the relationship between raw goods and finished goods is known. The method then proceeds to 604 where supplier forecast data is received. In one exemplary embodiment, each supplier can supply one or more of the customer raw materials, such as milk, eggs, flour, packaging, or other raw materials. Supplier forecast data can also be dependent on predicted crop yields, industry conditions, weather conditions, or other predicted data. The method then proceeds to 606.

At 606, customer inventory data is received. The customer forecast data can be initially provided with the customer inventory data. Likewise, customer inventory data can be provided independently of the customer forecast data. In another exemplary embodiment, customer inventory data includes current level, minimum level, and maximum level for each inventory component, and the forecast data is implicitly derived from the customer inventory data. The method then proceeds to 608.

At 608, order data is generated. Order data can be generated by factoring current inventory levels into the forecast data, so as to prevent inventory levels from

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exceeding predetermined maximum and minimum levels, or other
suitable methods can be used to determine the order data.
The method then proceeds to 610.

5   At 610, it is determined whether the order data has
been modified. For example, the order data can be received
at the order migration system, and can be available for
modification by the customer over a period of weeks or
months. If it is determined at 610 that the order data has
not been modified, the method proceeds to 612 where the
10   order data that has been migrated from the forecast data is
used. The method then proceeds to 616. Alternatively, if
it is determined at 610 that the order data has been
modified, the method proceeds to 614 where the modified
order data is migrated. The method then proceeds to 616.

15   At 616, the order data is transferred to the supplier.
When the supplier receives the order data, either as a data
file or as an order in another suitable form, the migration
from the forecast data to the order data is completed. The
method then proceeds to 618 where shipping data is received
20   from the supplier. For example, the supplier can receive
the order data and can confirm the order data by sending an
impending ship date. Also or alternatively, the supplier
can send shipping data after shipping has occurred, and can
transmit deviation report data in the event an order cannot
25   be filled. The method then proceeds to 620.

At 620, the shipping data is transmitted to the
customer. For example, the shipping data can include
confirmation data where shipping dates and schedules have
been established. Alternatively, the shipping data can
30   include shipping delivery dates, conditions, modifications,
deviations, or other shipping data. The method then
proceeds to 622. At 622, confirmation data is received from

26

the customer. For example, the customer can transmit
confirmation data that the shipment has been received. The
confirmation data can also include discrepancy data, such as
defective goods, shipped quantities that differ from ordered
5   quantities, differences in quality, rejected goods, or other
suitable confirmation data.

In operation, method 600 is used to control the
migration of forecast data to order data. Method 600 allows
customers and suppliers to forecast requirements and
10 availability, respectively, of inventory items. In one
exemplary embodiment, method 600 is used in the food
manufacturing industry to control the allocation of food
resources. Component ingredients of food products can have
peak freshness periods, where extensive storage times can
15 result in such peak freshness periods being exceeded.
Unavailability of raw materials can result from crop
conditions, shipping problems, weather conditions, or other
unavoidable circumstances, so it is necessary to react to
changes in forecast requirements and availability to a
20 greater degree than in other industries. Unavailability of
packing materials for prepared food products can also result
in the spoilage of both raw materials and finished product.
Thus, in the food manufacturing industry, close coordination
of shipments between suppliers and manufacturers is crucial.
25 Method 600 can minimize food spoilage and ensure that the
shelf life of dry components is not exceeded.

Likewise, method 600 can be used in other industries to
facilitate the production of components and replacement
inventory for manufacturers and suppliers, from raw goods
30 producers to finished consumer products producers. Many
industries utilize raw goods and intermediate components
that have either a shelf-life component or a time-varying

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value, such that delays in shipping and material unavailability can significantly affect the price of the product. Method 600 can be used to minimize avoidable delays.

5   **FIGURE 7** is a flow chart of a method 700 for generating order data from forecast data in accordance with an exemplary embodiment of the present invention. Method 700 can be used to generate order data based on customer forecasts and inventory data.

10   Method 700 begins at step 702 where customer inventory minimum and maximum data is received. For example, the customer can provide minimum and maximum inventory ranges for one or more inventory components. The method then proceeds to 704 where the customer inventory level is
15   received. The customer inventory level can be provided in combination with inventory minimum and maximum level data, can be transmitted periodically based upon current inventory levels, can be derived from product shipment data where the correlation between product volume and inventory usage is
20   known, or other suitable procedures can be used. The method then proceeds to 706.

At 706, customer forecast data is received. The customer forecast data can include projected requirements for periods beyond the immediate shipping period window.
25   For example, the amount of time required by a customer or a supplier from the time the order is placed to the time the product is delivered can range from less than 1 week to more than 1 month. Forecast data extends beyond such times, depending upon the requirements of the specific customer and
30   supplier. The customer forecast data is received at 706 and the method proceeds to 708.

At 708, supplier forecast data is received. The

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supplier forecast data can also include price incentive data, such as price breaks for increasing the size of the shipment, increasing the lead time for shipment, or other order variations, in addition to price penalties for
5   canceling or modifying an order after a certain date. For example, any changes in the orders after the supplier order processing has begun can result in increasing penalties due to the increased risk of spoilage of the product, administrative costs, or other factors. The method then
10 proceeds to 710.

At 710, customer order data is determined based on the forecast data and the customer inventory level data. For example, the customer order data can be derived by subtracting current inventory levels from the forecast data.
15 Likewise, intervening customer order data can be used to adjust or modify the customer order data, such as to compensate for customer orders that have either been ordered and have not been delivered, for earlier forecast periods, or for other factors. The method then proceeds to 712.

20 At 712, it is determined whether the order plus the inventory level is greater than the maximum inventory level. If it is determined that the order plus the inventory level would exceed the maximum set by the customer, the method proceeds to 714 where the order is decreased by the
25 difference between the sum of the order and the inventory level and the maximum inventory level. In this manner, the fulfillment of the order will not cause the maximum inventory level to be exceeded. If it is determined at 712 that the order plus the inventory level are not greater than
30 the maximum inventory level, the method proceeds to 716.

At 716, it is determined whether the order plus the inventory level is less than a minimum inventory level. If

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the order plus inventory level is less than the minimum, the
method proceeds to 718, where the order is increased by the
difference between the order plus inventory level and the
minimum inventory level.   In this manner, the order will
5   bring the inventory level up to the minimum inventory level.
If it is determined at 716 that the order plus the inventory
level is not less than the minimum inventory level, the
method proceeds to 714 and the forecast order data is
migrated for use as order data.

10   In operation, method 700 is used to migrate forecast
data to order data without operator intervention.   Inventory
level, inventory minimum and maximum level, and forecast
data are initially received.   These quantities can also be
modified over time depending upon changes in business
15 conditions, changes in order levels, and other changes.
Prior to the migration of the forecast to an order, it is
determined whether the order data needs to be modified in
order to keep the resulting inventory levels within
predetermined minimums and maximums.   If it is determined
20 that the order data needs to be modified in accordance with
the inventory data, the order data is modified and then is
migrated to form the order that is placed with the supplier.
In this manner, the order data is migrated without operator
intervention from the supplier or the customer and is placed
25 with the supplier, thus reducing the amount of operator
interaction required to place routine orders.

FIGURE 8 is a flow chart of a method 800 for allocating
forecast data in accordance with an exemplary embodiment of
the present invention.   Method 800 can be used to allocate
30 forecast data for orders prior to migration of the orders to
suppliers.

Method 800 begins at 802 where customer forecast data

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is received.   The method then proceeds to 804 where preferred supplier forecast data is received.   For example, the customer can identify one or more suppliers to be preferred suppliers, can designate the order of preferred suppliers, or can designate other suitable information. After the preferred supplier forecast data is received at 804, the method proceeds to 806.

At 806, it is determined whether the supplier forecast data exceeds the customer forecast data.   For example, the customer can forecast a need for 10,000 pounds of enriched white flour, but the supplier can forecast a supply of 20,000 pounds of enriched white flour.   If it is determined that the supplier forecast exceeds the customer forecast at 806, the method proceeds to 808 and the order data is migrated to the preferred supplier.   Otherwise, the method proceeds to 810.

At 810, the supplier forecast data for the next highest ranked supplier is received.   For example, suppliers can be ranked according to user preference, user selected data, price, or other suitable criteria.   The method then proceeds to 812 where the supplier forecast data for all selected suppliers is summed.   The method then proceeds to 814.

At 814, it is determined whether the sum of the supplier forecast data for all suppliers is greater than the customer forecast data.   If the sum is greater, the method proceeds to 816.   Otherwise, the method returns to 810.   At 816, orders are allocated between suppliers according to predetermined criteria.   For example, orders can be split evenly among suppliers to the extent that the suppliers can meet the order allocation.   Likewise, the preferred supplier can be given an order to the maximum amount that their forecast can support, with the residual amount being

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assigned to the remaining suppliers in order of preference. Other suitable methods can be used to allocate the order between suppliers.

5   In operation, method 800 is used to allocate order data before the orders are migrated. Method 800 thus allows order allocation to be automated so that operator intervention in the allocation process is not required. Method 800 thus eliminates the potential for human error or oversight, and ensures that objective criteria will be used

10   to allocate orders between two or more suppliers.

Although preferred and exemplary embodiments of a system and method for forecast and order processing have been described in detail herein, those skilled in the art will also recognize that various substitutions and modifications

15   can be made to the systems and methods without departing from the scope and spirit of the appended claims.

WHAT IS CLAIMED IS:

1.   A   system   for   processing   transactions   between
suppliers and customers comprising:

        a forecast system that receives forecast need data from
5   at least one customer and forecast supply data from at least
one supplier; and

        an order migration system coupled to the forecast
system, the order migration system operable to generate
order data for each customer based on inventory data for the
10   customer, the forecast need data of the customer, and the
forecast supply data of each supplier.

2.   The system of claim 1 further comprising an order
system coupled to the order migration system, the order
15   system operable to receive the order data, to generate
supplier order data for each supplier, to generate customer
order data for the customer, to receive shipment data from
each supplier, and to generate shipment data for the
customer.
20

3.   The system of claim 2 wherein a different data
format can be used to transmit and receive data for each
supplier and the customer.

25   4.   The system of claim 1 wherein the order migration
system further comprises an inventory management system
operable to store inventory minimum and maximum level data
for individual inventory components for each customer,
historical purchasing data for each inventory component for
30   each customer, and current inventory level data for each
inventory component for each customer.

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5.   The system of claim 1 wherein the order migration
system further comprises a customer reporting analysis
system operable to generate inventory exception data from
5   the inventory data for each customer that identifies
component inventory levels that are above or below
predetermined levels.

6.   The system of claim 2 wherein the order migration
10   system further comprises a supplier analysis system operable
to generate supplier performance data from the supplier
order data and the shipment data.

7.   The system of claim 1 further comprising a
15   notification system coupled to the order migration system,
the notification system operable to generate notification
data for each customer based upon the inventory data for the
customer, the forecast need data of the customer, and the
forecast supply data of each supplier, and to transmit the
20   notification data to each customer.

8.   The system of claim 1 wherein the forecast system
further comprises an auction system that can receive bid
data from each of the one or more suppliers that corresponds
25   to the forecast need data of each customer.

9.   The system of claim 1 wherein the forecasting
system further comprises an auction system that can receive
bid data from the customer that corresponds to the forecast
30   supply data of each supplier.

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10.   A   system   for   industry   resource   planning
comprising:

two or more supplier interface systems;

two or more customer interface systems; and

5   a resource planning system coupled to the two or more
supplier interface systems and the two or more customer
interface systems, the resource planning system operable to
receive forecast data from each of the supplier interface
systems and each of the customer interface systems, to

10   determine whether an imbalance exists in the forecast data,
and to generate notification data if an imbalance exists in
the forecast data.

11.   The system of claim 10 further comprising an order

15   migration system coupled to the resource planning system,
the order migration system operable to generate order data
for each customer based on inventory data for that customer
and the forecast data for that customer and the two or more
suppliers.

20

12.   The system of claim 11 wherein the order migration
system is further operable to receive supplier response data
to the notification data and customer response data to the
notification data and to use the supplier response data and

25   the customer response data to generate the order data.

13.   The system of claim 10 further comprising an order
system coupled to. the order migration system, the order
system operable to receive the order data, to generate
supplier order data for each supplier, to generate customer
5 order data for the corresponding customer, to receive
shipment data from each supplier, and to generate shipment
data for the corresponding customer.

14. A   method   for   industry   resource   planning
comprising:

receiving forecast need data for one or more inventory
items from each of one or more customers;

5   receiving inventory data for each of the inventory
items from each of the customers; and

generating order data for each inventory item of each
customer as a function of the inventory data for each
customer and the forecast need data for each customer.

10

15.   The method of claim 14 wherein generating order
data further comprises subtracting the difference between
the current inventory level and the minimum inventory level
from the order data.

15

16.   The method of claim 14 further comprising:
adding the order data to the current inventory data to
generate a forecast inventory level; and

subtracting the difference between the forecast
20 inventory level and a maximum inventory level from the order
data if the forecast inventory level is greater than the
maximum inventory level.

17.   The method of claim 14 further comprising:
25   receiving forecast supply data for each of the
inventory items from two or more suppliers; and

allocating the order data between each of two or more
suppliers if the order data is greater than the forecast
supply data for any of the suppliers.

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18.   The method of claim 14 further comprising:

receiving   forecast   supply   data   for   each   of   the
inventory items; and

generating   notification   data   if   the   forecast   supply
5   data is less than the order data.

19.   The   method   of   claim   14   further   comprising
receiving a bid on the order data from each of one or more
suppliers.
10

20.   The   method   of   claim   17   wherein   allocating   the
order   data   between   the   two   or   more   suppliers   further
comprises:

ranking the suppliers based upon feedback data; and
15   allocating order data between the two or more suppliers
based upon the rank of each supplier.

<u>100</u>

FIGURE 1
014501.0003

SUPPLIER SYSTEM
<u>106</u>

FORECAST AND ORDER MIGRATION SYSTEM
<u>102</u>

SUPPLIER SYSTEM
<u>108</u>

CUSTOMER SYSTEM
<u>104</u>

108

FIGURE 2
014501.0003

100

FORECAST
SYSTEM 202

AUCTION
SYSTEM
208

TO
SUPPLIER
SYSTEMS

204

CUSTOMER
REPORTING
SYSTEM
212

NOTIFICATION
SYSTEM
216

INVENTORY
MANAGEMENT
SYSTEM
210

SUPPLIER
ANALYSIS
SYSTEM
214

TO
CUSTOMER
SYSTEMS

ORDER PROCESSING SYSTEM
206
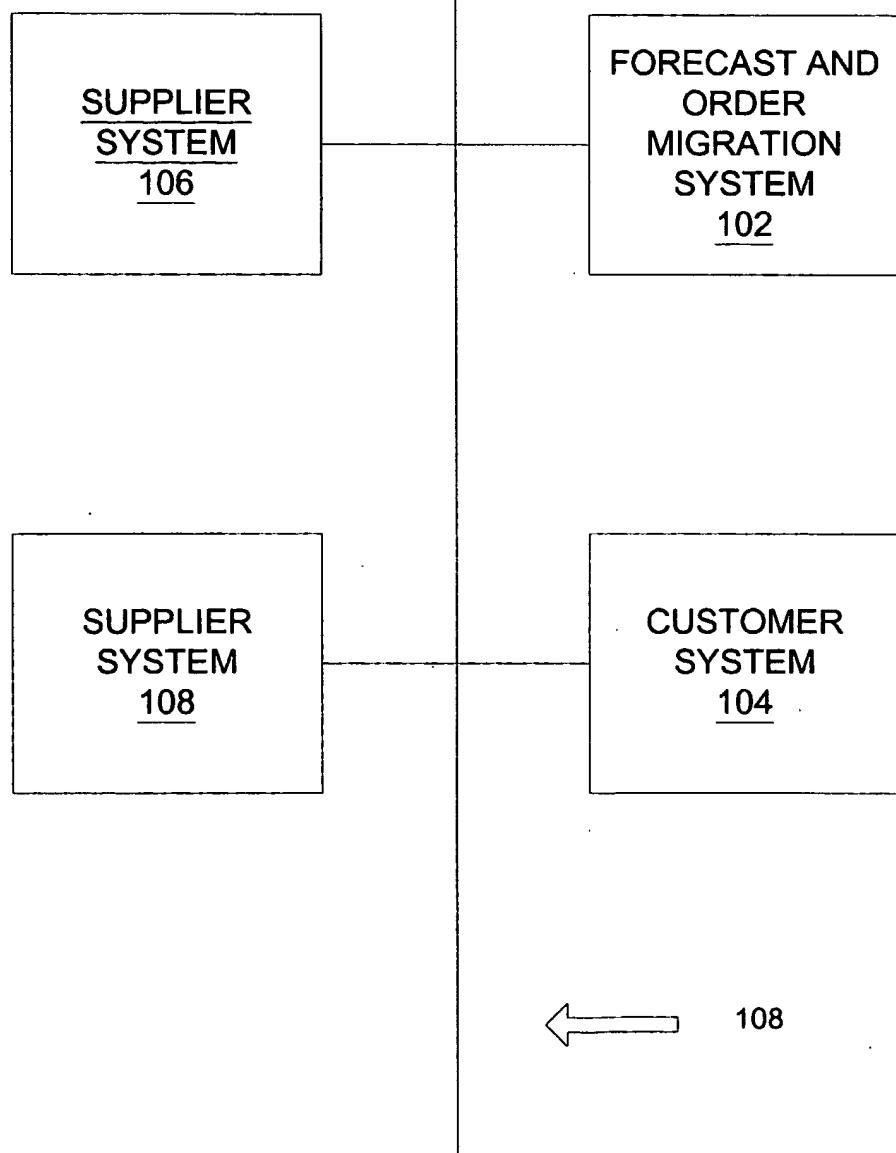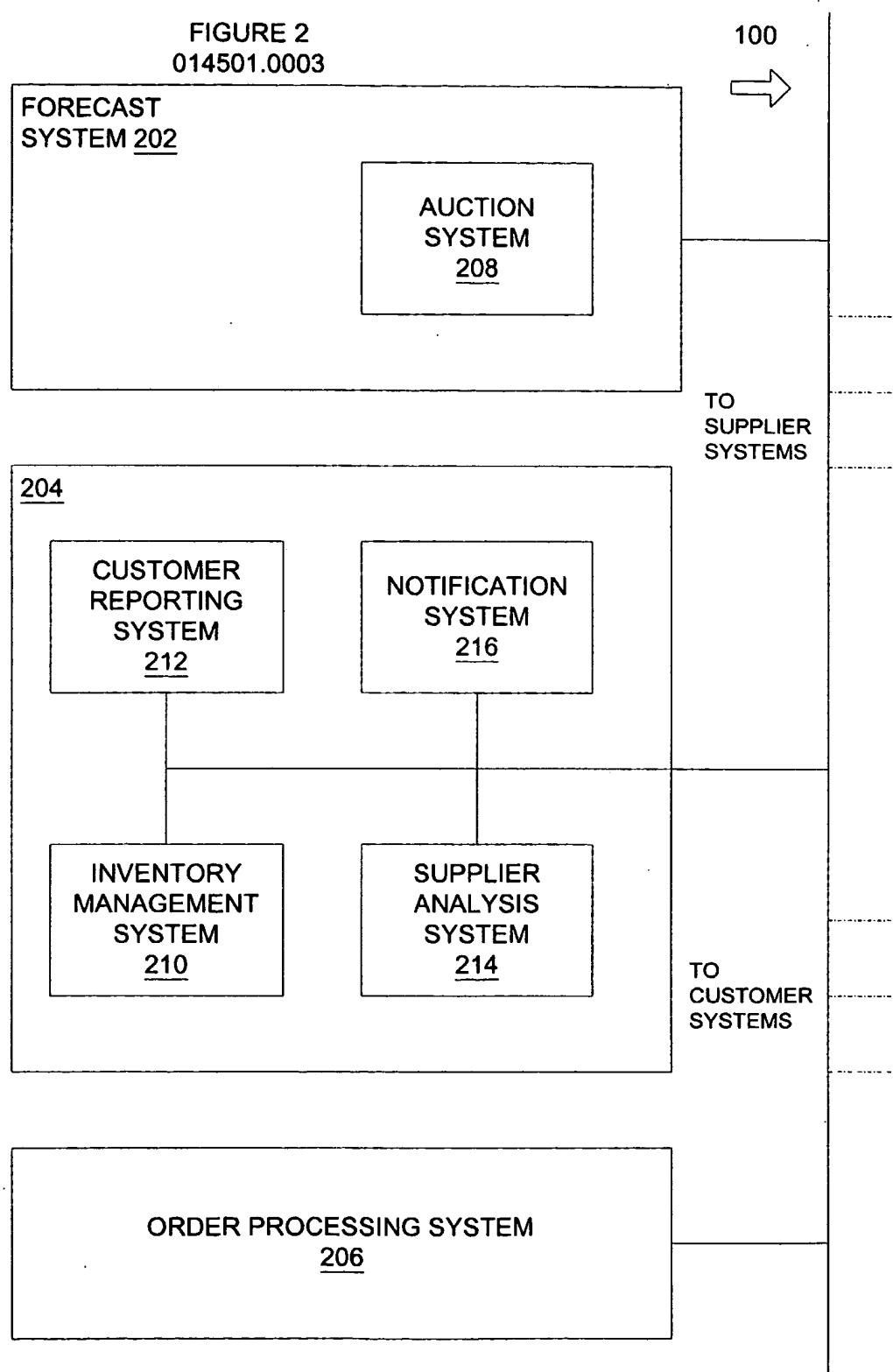
FIGURE 3
014501.0003

CUSTOMER
SYSTEM

⇩ 300

FORECAST
ENTRY SYSTEM
302

INVENTORY
ENTRY SYSTEM
304

ORDER MIGRATION
REPORTING SYSTEM
306

NOTIFICATION
SYSTEM
308

SUPPLIER
REPORTING
SYSTEM
310

ORDER ENTRY
SYSTEM
312

FIGURE 4
014501.0003
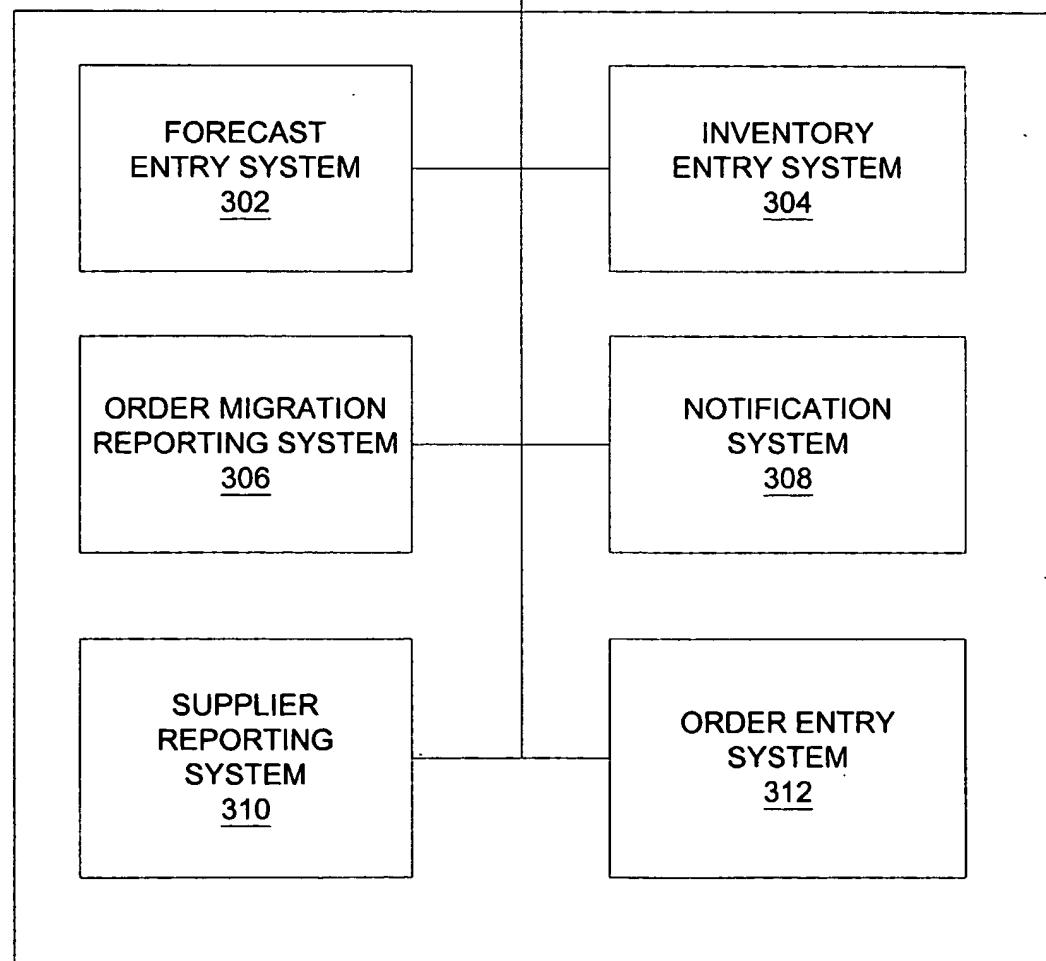
SUPPLIER
SYSTEM

400

FIGURE 5
014501.0003

500 ⬇

RECEIVE CUSTOMER FORECAST DATA	602

FIGURE 6
014501.0003

RECEIVE SUPPLIER FORECAST DATA	604

600

RECEIVE CUSTOMER INVENTORY DATA	606

GENERATE ORDER DATA	608

YES   ORDER DATA MODIFIED?   NO
610

MIGRATE MODIFIED ORDER DATA	614

MIGRATE ORDER DATA	612

TRANSFER ORDER DATA TO SUPPLIER	616

RECEIVE SHIPPING DATA FROM SUPPLIER	618

TRANSMIT SHIPPING DATA TO CUSTOMER	620

RECEIVE CONFIRMATION DATA FROM CUSTOMER	622

FIGURE 7
014501.0003

```
              ┌─────────────────────────┐
              │   RECEIVE INVENTORY     │  702
              │ MINIMUM AND MAXIMUM     │
              └────────────┬────────────┘
                           │
              ┌────────────▼────────────┐
              │    RECEIVE CUSTOMER     │  704
              │    INVENTORY LEVEL      │
              └────────────┬────────────┘
                           │
              ┌────────────▼────────────┐
              │    RECEIVE CUSTOMER     │  706
              │     FORECAST DATA       │
              └────────────┬────────────┘
                           │
              ┌────────────▼────────────┐
              │    RECEIVE SUPPLIER     │  708        700
              │     FORECAST DATA       │          ⇐
              └────────────┬────────────┘
                           │
              ┌────────────▼────────────┐
              │  DETERMINE CUSTOMER     │  710
              │      ORDER DATA         │
              └────────────┬────────────┘
                           │
   YES                     ▼                      NO
          ╱──────────────────────────────╲
         ╱          ORDER + INV.           ╲
        ╱             > MAX?                ╲
        ╲                              712  ╱
         ╲──────────────────────────────╱
  ┌──────────────────┐
  │ DECREASE ORDER BY│  714
  │   DIFFERENCE     │
  └──────────────────┘
                           ▼
          ╱──────────────────────────────╲
         ╱          ORDER + INV.           ╲
        ╱             < MIN.?               ╲
        ╲                              716  ╱
         ╲──────────────────────────────╱
  ┌──────────────────┐
  │INCRREASE ORDER BY│
  │   DIFFERENCE     │
  └──────────────────┘
            718                    ( END )  720
```

RECEIVE CUSTOMER FORECAST DATA | 802

RECEIVE CUSTOMER FORECAST DATA | 804

800

YES

NO

SUPPLIER > CUSTOMER | 806

RECEIVE CUSTOMER FORECAST DATA | 808

END

RECEIVE CUSTOMER FORECAST DATA | 810

RECEIVE CUSTOMER FORECAST DATA | 812

YES

NO
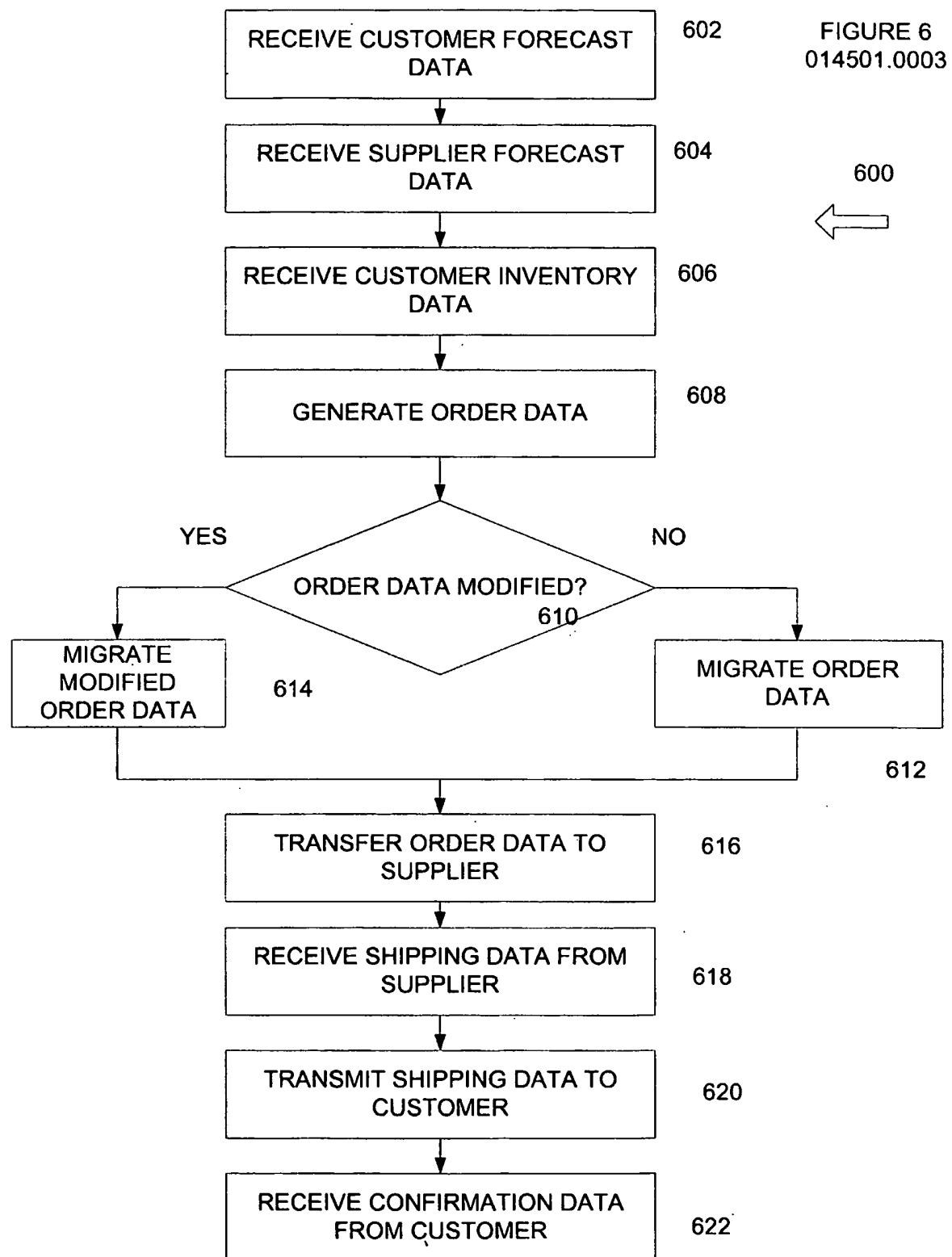
SUPPLIER > CUSTOMER | 814

RECEIVE CUSTOMER FORECAST DATA | 816
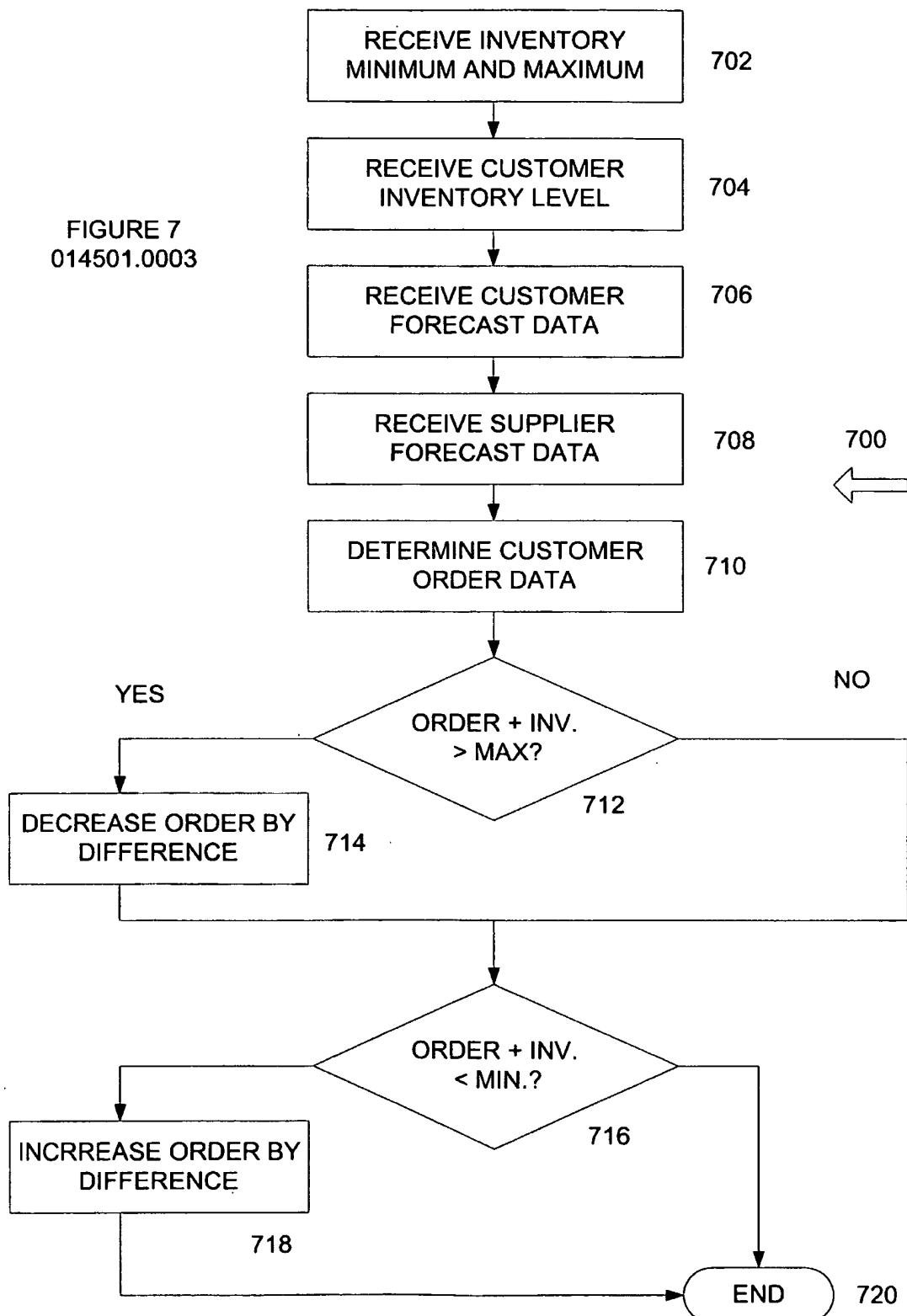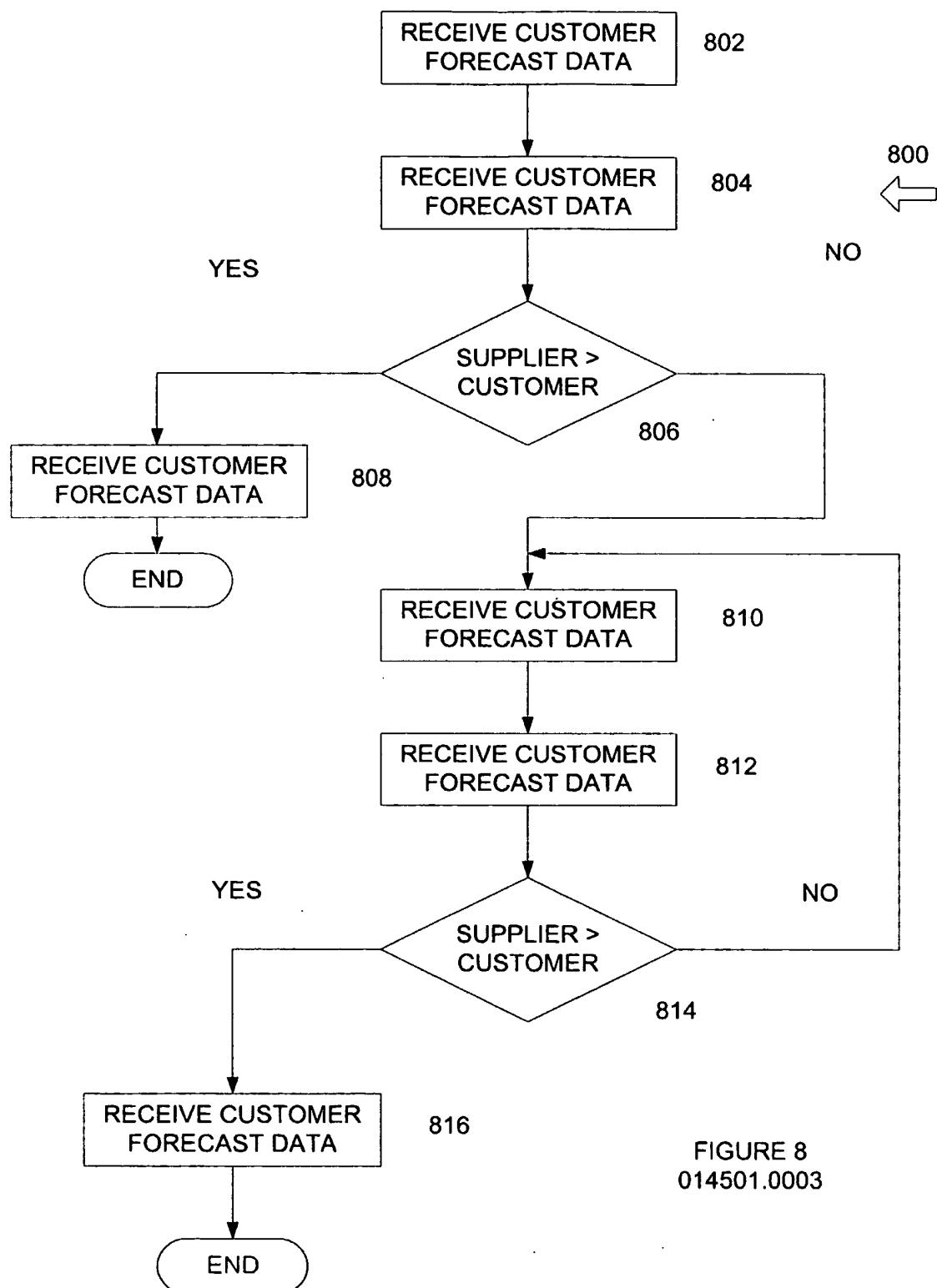
END

FIGURE 8
014501.0003

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/09342

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 19/00

US CL :705/10, 28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/10, 28

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WEST 2.0, CAS ONLINE, DIALOG, IEEE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,765,143 A (SHELDON et al) 09 June 1998, see entire document.	1-20
A	US 5,854,746 A (YAMAMOTO et al) December 1998, see entire document.	1-20
A	US 5,914,878 A (YAMAMOTO et al) 22 June 1999, see entire document.	1-20

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	
"E"	earlier document published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
		"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	
"P"	document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 MAY 2001	15 JUN 2001

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	TARIQ R TARIQ
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Form PCT/ISA/210 (second sheet) (July 1998)*